

Notice of Allowability

Application No.

10/648,772

Applicant(s)

TAKAHASHI ET AL.

Examiner

Pritham Prabhakher

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/24/2007.
2. ☒ The allowed claim(s) is/are 5-18.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John P. Scherlacher (Registration No. 23,009) on 10/02/2007.

The application has been amended as follows:

1. **Claim 10** has been amended to read as follows -- *An image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping circuit operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period; wherein the control circuit controls such that a clamping circuit section operates, within a predetermined period after image capturing by the solid*

image capturing element is started, in a period which is longer by an amount ΔL than a period L in which the clamping circuit section operates in another period; *and wherein the control circuit controls such that the amount ΔL remains constant within a predetermined period after commencement of image capturing by the solid image capturing element--.*

2. Claim 11 had been amended to read as follows -- *An image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping circuit operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period; wherein the control circuit controls such that a clamping circuit section operates, within a predetermined period after image capturing by the solid image capturing element is started, in a period which is longer by an amount ΔL than a period L in which the clamping circuit section operates in another period; *and wherein the control circuit controls so as to reduce the amount ΔL within a predetermined period after commencement of image capturing by the solid image capturing element--.**

Allowable Subject Matter

Claims 5-18 are allowed.

The following is an examiner's statement of reasons for allowance:

*In regard to **Claim 5**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the clamping circuit comprises two or more clamping circuit sections, and the control circuit controls such that a larger number of clamping circuit sections operate within a predetermined period after start of image capturing by the solid image capturing element than in another period".*

*Regarding **Claim 6**, this claim is allowed as being dependent on allowed independent claim 5.*

With regard to **Claim 7**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping capability within a predetermined period after start of image capturing by the solid image capturing element becomes higher in level than the clamping capability attained in another period; wherein the clamping circuit comprises two or more clamping circuit sections, and wherein the control circuit controls such that a larger number of clamping circuit sections operate longer within a predetermined period after start of image capturing by the solid image capturing element than in another period".

In regard to **Claim 8**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for

controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping capability within a predetermined period after start of image capturing by the solid image capturing element becomes higher in level than the clamping capability attained in another period; **wherein the clamping circuit comprises two or more clamping circuit sections which respectively have clamping capabilities at different levels, and wherein the control circuit controls such that a clamping circuit section at a higher level operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period**".

Regarding **Claim 9**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such

that the clamping circuit operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period; and wherein the control circuit controls such that a clamping circuit section operates, within a predetermined period after image capturing by the solid image capturing element is started, in a period which is longer by an amount ΔL than a period L in which the clamping circuit section operates in another period".

With regard to **Claim 10**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping circuit operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period; wherein the control circuit controls such that a clamping circuit section operates, within a predetermined period after image capturing by the solid image capturing element is started, in a period which is longer by an amount ΔL than a period L in which the clamping circuit section operates in another period; and wherein the

control circuit controls such that the amount ΔL remains constant within a predetermined period after commencement of image capturing by the solid image capturing element".

Regarding **Claim 11**, the closest prior art of record fails to teach or reasonably suggest, "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping circuit operates longer within a predetermined period after start of image capturing by the solid image capturing element than in another period; **wherein the control circuit controls such that a clamping circuit section operates, within a predetermined period after image capturing by the solid image capturing element is started, in a period which is longer by an amount ΔL than a period L in which the clamping circuit section operates in another period; and wherein the control circuit controls so as to reduce the amount ΔL within a predetermined period after commencement of image capturing by the solid image capturing element**".

With regard to **Claim 12**, the closest prior art of record fails to teach or reasonably suggest, "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; a control circuit for controlling such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; and

a detection circuit for measuring an inoperative period during which the solid image capturing element suspends image capturing, wherein the control circuit controls such that the clamping capability within a predetermined period after start of image capturing by the solid image capturing element becomes higher in level than the clamping capability attained in another period, and controls such that the clamping capability becomes higher in level with respect to a longer inoperative period".

Regarding **Claims 13-15**, these claims are allowed as being dependent from allowed independent claim 12.

In regard to **Claim 16**, the closest prior art of record fails to teach or reasonably suggest, "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a

*clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; wherein the control circuit controls such that the clamping capability within a predetermined period after start of image capturing by the solid image capturing element becomes higher in level than the clamping capability attained in another period; and further comprising: **a buffer circuit for outputting a predetermined reference voltage; and a switch connected between the buffer circuit and a signal line connected to an output terminal of the solid image capturing element, for switching between in an on state and in an off state, and wherein the control circuit controls the clamping capability by changing a period in which the switch remains in an on state**".*

*With regard to **Claim 17**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period*

after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; **further comprising: a plurality of buffer circuits for outputting a predetermined reference voltage; a selector for selecting at least one of the plurality of buffer circuits; a switch connected between the buffer circuit selected by the selector and a signal line connected to an output terminal of the solid image capturing element, for switching between in an on state and in an off state, wherein the control circuits controls the clamping capability by changing either a type or a number of the buffer circuit selected by the selector.**

Regarding **Claim 18**, the closest prior art of record fails to teach or reasonably suggest "an image capturing device, comprising: a solid image capturing element; a driving circuit for driving the solid image capturing element to obtain an image signal; a clamping circuit for clamping a reference level of the image signal generated by the solid image capturing element at a predetermined level; and a control circuit for controlling clamping capability of the clamping circuit; wherein the control circuit controls such that a clamping capability attained within a predetermined period after start of image capturing by the solid image capturing element becomes different from a clamping capability attained in another period; **further comprising: a plurality of buffer circuits for outputting a predetermined reference voltage; a selector for selecting at least one of the plurality of buffer circuits; a switch connected between the buffer circuit selected by the selector and a signal line connected to**

an output terminal of the solid image capturing element, for switching between in an on state and in an off state, wherein the control circuits controls the clamping capability by changing at least one of a period in which the switch remains in an on state, a type of the buffer circuit selected by the selector, and a number of the buffer circuit selected by the selector.

The following are the closest references found:

Funakoshi et al. (US Patent No.: 7061531B2) teaches of "An imaging device that uses a solid state imaging element, during multi-field accumulation to prevent shading and oscillatory phenomena such as repeated black and white patterns. A signal is supplied from a timing signal generation circuit to switches, and controls the ON/OFF operation. During the H period of the signal, the switch is closed, and the output value of an amplifier is input to a capacitor. During the L period of the signal, the switch is opened, and the average value of the output of the amplifier is maintained in the capacitor. During the H period, the switch is open, while during the L period, the switch is in the ON state. At this time, the level of the capacitor C2 and the output of the amplifier are input to an amplifier, and their difference is amplified and supplied to a capacitor C3 via the switch".

Yoshihara et al. (US Patent No.: 6480228B1) teaches of "When a signal output by a solid-state image sensing device is clamped to a predetermined reference potential, a high voltage generated in a transfer suspension period after the clamping is generally supplied to an A/D converter as generated. A sample/hold output Va is

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clamped to a clamp level V_{ref} over a period of time between a halfway point of time of a signal of a picture element preceding ahead by one line and the end of an inhibit period of transfer clocks of a signal output by an empty transmission unit via a first clamp pulse and a sample/hold output for the second picture element, or a subsequent one of an OPB unit is clamped to the clamp level via a second clamp pulse to prevent a signal output from exceeding a reference voltage from being supplied to an A/D converter at a later stage".

Abe (US Patent No.: 6700609B1) teaches of "An optical black portion in an output of a CCD image pickup device that is extracted and a clamp level of each line that is obtained by an integrating and averaging circuit. A difference value of the clamp levels between the front and rear lines and an absolute value of the difference are calculated by a comparing circuit. Either the clamp level of each line or the clamp level updated every (+1) or (-1) is selected by a selector in accordance with whether the absolute value of the difference of the clamp levels between the front and rear lines lies within a predetermined range or not. The clamp level which is outputted from the selector is subtracted from the output of the CCD image pickup device".

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pritham Prabhakher whose telephone number is 571-270-1128. The examiner can normally be reached on M-F (7:30-5:00) Alt Friday's Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571)272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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